

WHAT IS CLAIMED IS:

1. A method for correlating the execution throttle levels of the servers of a network to the command queue depth of the storage controllers in the network, each of the storage controllers managing one or more logical storage units, comprising the steps of:

identifying the servers of the network;

identifying the logical ownership of each logical storage unit on the network;

verifying that a rule governing the command throughput of the servers and storage controllers of the network is satisfied, the rule defining a relation between the execution throttle levels of the servers of the network and command queue depth of the storage controllers of the network; and

adjusting the execution throttle level of at least one server of the network in response to a determination that the rule was not satisfied.

2. The method of claim 1, wherein the rule provides that the sum of the execution throttle levels of those servers having logical ownership over a LUN of each respective storage controller does not exceed the command queue depth of each respective storage controller.

3. The method of claim 2, wherein the step of adjusting the execution throttle level of at least one server comprises the step of decrementing the execution throttle level for a selected server that is associated with the storage controller for which the rule was not satisfied.

4. The method of claim 2, wherein the step of adjusting the execution throttle level of at least one server comprises the step of incrementing the execution throttle level for a selected server that is associated with the storage controller for which the rule was not satisfied.

5. The method of claim 3, wherein the selected server is the server that has the highest execution throttle.

6. The method of claim 4, wherein the selected server is the server that has the lowest execution throttle.

5 7. The method of claim 4, wherein the selected server is the server that has the highest input/output demand.

8. The method of claim 3, wherein the selected server is the server that has the lowest input/output demand.

9. The method of claim 3, wherein the selected server is selected according to a round robin format.

10. The method of claim 5, further comprising the step of repeating the verifying and adjusting steps until the sum of the execution throttle levels for those servers having logical ownership over a LUN of each respective storage controller does not exceed the command queue depth of each respective storage controller.

11. The method of claim 10, further comprising the step of determining whether the execution throttle of each server exceeds a minimum execution throttle setting.

12. The method of claim 11, wherein the verifying and adjusting steps are automated.

13. The method of claim 12, further comprising the step of setting the execution throttle level of each server to its maximum level prior to performing the first of the verifying and adjusting steps.

14. A storage area network, comprising:
a plurality of servers within the network, each server having an execution throttle;
a plurality of storage controllers coupled to the network, each storage controller
having a command queue depth, and each storage controller managing one or more logical storage
5 units;

wherein the execution throttle level of each server is set such that the execution
throttle of each server is correlated to the command queue depth of each storage controller.

15. The storage area network of claim 14, wherein the correlation of the execution throttle
levels of each server to the command queue depth of each storage controller is governed by a rule
that the sum of the execution throttle levels of those servers having logical ownership over a LUN
of a respective storage controller does not exceed the command queue depth of the respective storage
controller.

16. The storage area network of claim 15, wherein the execution throttle level of the
servers may be adjusted such that the sum of the execution throttle level of those servers having
logical ownership over a LUN of a respective storage controller does not exceed the command queue
depth of the respective storage controller.

17. The storage area network of claim 16, wherein the execution throttle level of the
servers of the storage area network may be adjusted and verified repeatedly until the sum of the
execution throttle level of those servers having logical ownership over a LUN of a respective storage
controller does not exceed the command queue depth of the respective storage controller.

18. The storage area network of claim 17, wherein the execution throttle level of each
server further exceeds a minimum execution throttle level.

19. The storage area network of claim 18, wherein the adjustment and verification of execution throttle level is automated.

20. The storage area network of claim 19, wherein the execution throttle level of each
5 server is set to its maximum level prior to adjusting or verifying the execution throttle levels of any
of the servers of the storage area network.

09770607-01601
TESTO-2060260

21. A method for setting the execution throttle levels of a plurality of servers in a storage area network, the storage area network including a plurality of storage controllers, each of the storage controllers having associated therewith one or more logical storage units, comprising the steps of;

5 identifying for each storage controller the servers that logically own each of the logical storage units managed by the storage controller;

summing, for each storage controller, the execution throttle levels of the servers that are identified as owning the logical storage units managed by the storage controller;

determining, for each storage controller, whether the summed execution throttle level exceeds the command queue depth of the storage controller; and

if the summed execution throttle level exceeds the command queue depth, adjusting the execution throttle level of one or more of the servers of the storage area network.

016295.0641 (DC-02789)

22. A method for correlating the execution throttle levels of the servers of a network to the command queue depth of the storage controllers in the network, each of the storage controllers managing one or more logical storage units, comprising the steps of:

identifying the servers of the network;

identifying the logical ownership of each logical storage unit of on the network;

providing independent server execution throttles for each storage controller that is accessed by the servers;

verifying that a rule governing the command throughput of the servers and storage controllers accessed by the servers is satisfied, the rule defining a relation between the independent execution throttle levels of the servers accessing the storage controllers and command queue depth of those storage controllers;

adjusting the independent execution throttle level of at least one server in response to a determination that the rule was not satisfied;

23. The method of claim 22, wherein the rule provides that the sum of the independent execution throttle levels of those servers having logical ownership over a LUN of each respective storage controller does not exceed the command queue depth of each respective storage controller.

24. The method of claim 23, wherein the step of adjusting the independent execution throttle level of at least one server comprises the step of decrementing the independent execution throttle level for a selected server that is associated with the storage controller for which the rule was not satisfied.

25. The method of claim 23, wherein the step of adjusting the independent execution throttle level of at least one server comprises the step of incrementing the execution throttle level for a selected server that is associated with the storage controller for which the rule was not satisfied.

26. The method of claim 24, wherein the selected server is the server that has the highest independent execution throttle.

27. The method of claim 25, wherein the selected server is the server that has the lowest independent execution throttle.

28. The method of claim 25, wherein the selected server is the server that has the highest command throughput.

29. The method of claim 24, wherein the selected server is the server that has the lowest command throughput.

30. The method of claim 24, wherein the selected server is selected according to a round robin format.

31. The method of claim 26, further comprising the step of repeating the verifying and adjusting steps until the sum of the independent execution throttle levels for those servers having logical ownership over a LUN of each respective storage controller does not exceed the command queue depth of each respective storage controller.

5

32. The method of claim 31, further comprising the step of determining whether the independent execution throttle of each server exceeds a minimum execution throttle setting.

33. The method of claim 32, wherein the verifying and adjusting steps are automated.

34. The method of claim 33, further comprising the step of setting the independent execution throttle level of each server to its maximum level prior to performing the first of the verifying and adjusting steps.

09770907.016501